Effect of yoga on patients with cancer

Our current understanding

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Abstract

Objective To determine whether therapeutic yoga improves the quality of life of patients with cancer.

Data sources Search of MEDLINE database (1950-2010) using key words *yoga*, *cancer*, and *quality of life*.

Study selection Priority was given to randomized controlled clinical studies conducted to determine the effect of yoga on typical symptoms of patients with cancer in North America.

Synthesis Initially, 4 randomized controlled clinical studies were analyzed, then 2 studies without control groups were analyzed. Three studies conducted in India and the Near East provided interesting information on methodologies. The interventions included yoga sessions of varying length and frequency. The parameters measured also varied among studies. Several symptoms improved substantially with yoga (higher quality of sleep, decrease in symptoms of anxiety and depression, improvement in spiritual well-being, etc). It would appear that quality of life, or some aspects thereof, also improved.

Conclusion The variety of benefits derived, the absence of side effects, and the cost-benefit ratio of therapeutic yoga make it an interesting alternative for family physicians to suggest to their patients with cancer. Certain methodologic shortcomings, including the limited size of the samples and varying levels of attendance on the part of the subjects, might have reduced the statistical strength of the studies presented. It is also possible that the measurement scales used did not suit this type of situation and patient population, making it impossible to see a significant effect. However, favourable comments by participants during the studies and their level of appreciation and well-being suggest that further research is called for to fully understand the mechanisms of these effects.

According to the data, close to 40% of Canadian women and 45% of Canadian men will develop cancer at some point in their lives.[1] In addition to the symptoms affecting the organ or system, cancer is a cause of suffering.[2,3] During their illness and treatment, patients with cancer might experience fatigue, difficulty sleeping, and pain. They might also experience symptoms of depression or anxiety that affect them psychologically and socially.

Recent research and advances in the field of oncology have extended the lives of patients with cancer.[4] It is incumbent upon the care team—in particular the family physician—to ensure that as patients live longer, symptoms caused by their illness or its treatment are adequately relieved. Over the past decade, complementary and alternative therapies have become increasingly popular. The main goal of these complementary and alternative therapies is to improve quality of life by addressing the patient's symptoms.[5]

These modalities include massage, acupuncture, aromatherapy, and therapeutic yoga. Therapeutic yoga is described as a technique that integrates the practice and philosophy of yoga in order to improve health and well-being, enabling patients to play an active role in their treatment.[6-8]

The goal of this review of the literature is to determine whether therapeutic yoga has an effect on the symptoms

KEY POINTS Complementary and alternative therapies such as acupuncture, aromatherapy, and yoga are increasingly popular. Preliminary data suggest yoga is one of the most popular complementary and alternative therapies and is likely to improve quality of life. This review of the literature was conducted to determine whether yoga had an effect on the symptoms of patients with cancer. The findings suggest that it improves a range of symptoms. It would also appear that quality of life, either overall or certain aspects thereof, is also improved. Yoga could be a safe tool that family physicians looking for alternatives to standard pharmacologic treatments could offer to their patients with cancer.

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of patients with cancer. If so, it will also be important to determine whether, in turn, the amelioration in symptoms has a positive effect on patient quality of life.

DATA SOURCES

The goal of our research was to identify articles in the literature that discuss the effect of yoga on the quality of life of patients with cancer. Using the key word *yoga*, our search of the MEDLINE database (1950-2010) yielded 1465 results. Combining *yoga* and *cancer*, we identified 83 articles. Adding *quality of life* narrowed the search to 34 articles. Limiting our search to the adult population and articles written in French or English, we obtained a final result of 32 publications.

Study selection

We chose to exclude from the 32 articles identified any study in which the intervention involved mindfulness stress reduction techniques in addition to yoga. Randomized controlled studies were given priority over editorials, clinical cases, and articles on body-mind techniques in general. We then limited our formal analysis to patients whose cancer had been diagnosed recently (whether they were currently in treatment), rather than patients who were in remission. In our synthesis, we gave priority to studies conducted in North America because they had greater relevance to Canadians. It should be noted that a methodology based on a meta-analysis was not used because the interventions varied in terms of style, content, and length.

SYNTHESIS

Preliminary data suggest that yoga is one of the most popular complementary and alternative therapies[9] and most likely to improve quality of life.[10] First, we needed to confirm whether this information was borne out by the randomized clinical studies conducted in North America (**Table 1**[11-14]).

The study conducted by Chandwani et al[11] explored the effect of yoga on the quality of life of a group of women who were starting radiation therapy following a diagnosis of breast cancer, compared with a similar group placed on a waiting list. The results demonstrated that in the yoga group, there was an improvement in the score for physical functioning and perception of health 1 week after the end of treatment. However, 1 month later, levels of intrusive thoughts had increased. Three months after the end of treatment, the patients who had practised yoga perceived a greater feeling of benefit. Chandwani et al then established a correlation between these 2 findings, which suggested that the more intrusive thoughts might have been accounted for by the process of assimilating and adapting to the experience of suffering. Practising yoga did not have an effect on the other parameters measured.

Danhauer et al[12] conducted a study on the effect of practising yoga on women with breast cancer. He found a non-significant improvement in quality of life of the yoga group. Improvement became significant ($P \leq .0009$) when the analysis was limited to the spiritual component of well-being. Scores measuring mental state ($P = .004$), depressive symptoms ($P = .026$), and positive affect ($P = .01$) were significantly favourable in the yoga group. It was also observed that women with higher negative affect and lower emotional well-being were more likely to benefit from yoga, as were patients who were more diligent in their yoga practice.

The primary goal of the study by Moadel et al[13] was to determine whether yoga had an effect on quality of life. Where overall quality of life was concerned, no significant difference was observed; however, the part of the grid that measured well-being and social functioning improved in the yoga group. In addition, a secondary analysis involving just patients who had completed their treatment suggested the possibility of an improvement in overall quality of life in the yoga group, compared with a deterioration in quality of life in the control group.

The study by Cohen et al[14] sought to determine the effect of yoga on symptoms of fatigue and disturbed sleep in patients with lymphoma. Measuring distress and symptoms of anxiety and depression were among the secondary objectives of the study. In terms of fatigue, the study did not find a statistically significant difference between the 2 groups. However, several items of the grid measuring quality of sleep improved during the course of the study in the yoga group. Cohen et al deemed that this was a useful finding for the long term as it is recognized that better-quality sleep has a positive effect on overall health, tolerance of pain, quality of life, and symptoms of depression.[15,16]

Other studies were conducted in India[17,18] and Turkey[19] (**Table 2**[17-19]). Although caution must be exercised when transposing the findings of these studies onto the Canadian population, as yoga is not a Canadian custom, these studies nonetheless provide new information on yoga's ability to relieve certain physical symptoms (nausea and vomiting,[17] fatigue, insomnia, and anorexia[18]).

A few studies that lacked control groups—and were therefore limited in terms of their methodology—demonstrated significant improvement in several elements involved in the measurement of quality of life in individuals who had received a diagnosis of breast ($P < .01$) or ovarian cancer ($P < .05$) within the past 2 years[20] or who had had cancer within the past 6 months ($P \leq .001$)[21] (**Table 3**[20,21]). Positive comments were also made by the participants at the completion of the intervention.

Table 1. Randomized controlled clinical studies conducted in North America to determine the effect of yoga on patients with cancer

STUDY; LOCATION OF STUDY; TYPE OF STUDY	STUDY QUESTION	STUDY POPULATION	INTERVENTION	CONTROL GROUP	VARIABLES	RESULTS
Chandwani et al (2010)[11]; Texas, USA; RCCS	Does yoga improve quality of life and psychosocial aspects?	Women with breast cancer receiving RT (n = 61)	• VYASA yoga • Length: 6 wk; 2, 60-min sessions/wk plus personal practice	Waiting list	• SF-16 • BFI • PSQI • CES-D • STATE • IES • BFS	Yoga improved overall perception of health and physical functioning scores 1 wk after end of RT. Intrusive thoughts increased 1 mo later. Feeling that intervention was beneficial appeared in a significant way 3 mo after end of RT (P = .011)
Danhauer et al (2009)[12]; North Carolina, USA; RCPS	Does yoga result in improvements in physical and emotional well-being, quality of life, fatigue, and sleep?	Women with breast cancer 2-24 mo postsurgery or recurrence within past 24 mo (n = 44)	• Restorative yoga • Length: 10 wk; weekly 1.25-h sessions without personal practice	Waiting list	• SF-12 • FACT-B • FACIT-F • FACIT-Sp • CES-D • PSQI • PANAS	Yoga had a significant effect on emotional and spiritual well-being (P = .0009), perceptions of mental health (P = .004), and positive affect (P = .01). Fatigue improved during the intervention for the yoga group. It also appeared that a larger-scale project was feasible
Moadel et al (2007)[13]; New York, USA; RCCS	Does yoga improve quality of life, fatigue, emotional well-being, and spiritual well-being?	Women with recent or recurrent breast cancer (I-III) (n = 128); Dx ≤ 5 y	• Hatha yoga • Length: 12 wk; weekly 1.5-h sessions plus personal practice	Waiting list	• FACT • FACT-G • FACIT-F • FACIT-Sp • DMI	Compared with the control group, participants in the yoga group experienced less deterioration in the social component of well-being. A secondary analysis of patients not receiving CT showed an improvement in overall quality of life, emotional, social, and spiritual well-being, and mood
Cohen et al (2005)[14]; Texas, USA; RCCS	Does yoga improve emotional state, anxiety, depression, sleep, and fatigue?	Patients with lymphoma, with or without CT in past y (n = 39)	• Tibetan yoga • Length: 7 wk; weekly 1.5-h sessions plus personal practice	Waiting list	• IES • STATE • CES-D • BFI • PSQI	Yoga improved quality and quantity of sleep as well as sleep onset and need for sleep medication

BFI—Brief Fatigue Inventory, BFS—Benefit Finding Scale, CES-D—Centers for Epidemiologic Studies Depression scale, CT—chemotherapy, DMI—Distressed Mood Index, Dx—diagnosis, FACIT-F—Functional Assessment of Chronic Illness Therapy–Fatigue, FACIT-Sp—Functional Assessment of Chronic Illness Therapy–Spiritual Well-being, FACT—Functional Assessment of Cancer Therapy, FACT-B—Functional Assessment of Cancer Therapy–Breast, FACT-G—Functional Assessment of Cancer Therapy–General, IES—Impact of Events Scale, PANAS—Positive and Negative Affect Schedule, PSQI—Pittsburgh Sleep Quality Index, RCCS—randomized controlled clinical study, RCPS—randomized controlled pilot study, RT—radiation therapy, SF-12—12-Item Short Form Health Survey, SF-16—16-Item Short Form Health Survey, STATE—Spielberger State Anxiety Inventory, USA—United States of America, VYASA—Vivekananda Yoga Anusandhana Samsthana.

DISCUSSION

A number of different patient populations have been studied, with satisfactory results. These include patients with hypertension,[22] asthma,[23] low back pain,[24,25] and depression.[26] The limited number of patients in the studies might have affected the statistical strength, thereby explaining the lack of significant findings in several parameters.

Furthermore, in most oncology studies, the lack of an intervention for the control group makes it difficult to interpret the benefits of the studied interventions.[11-14] It is possible that the effect observed was merely owing to participation in an activity that provided opportunities for socialization or owing to participation in a physical activity. Consequently, in future studies, it would be useful to propose an intervention for the control group to be able to compare the specific benefits of yoga to the benefits of a nonspecific socialization activity, which is what the 2 Indian studies did.[17,18]

The studies presented here involved women with breast cancer almost exclusively.[11-13,17,18] It might be difficult to transpose these results onto male subjects or onto subjects of both sexes with other types of cancer. Consequently, in future studies, it would be useful to include a variety of cancer pathologies. Also, because yoga is a therapeutic approach that requires an investment of time on the part of patients, it is possible that the nature of the intervention itself has an effect on compliance. For various reasons, in the studies cited, patients sometimes did not attend yoga classes frequently, and this limited the observation of significant findings.[14] The authors tried to circumvent this problem by performing

statistical analyses on the subgroup of patients who had participated more diligently. In identifying a patient population that was less inclined to practise yoga, Desai et al[27] suggested ways to foster accessibility.

It was also difficult to draw any conclusion on the long-term effects of the intervention, given the brevity of most of the programs and the lack of follow-up in the months after completion of the intervention. In 2 studies, the authors

Table 2. Randomized controlled clinical studies conducted in India and the Near East to determine the effect of yoga on patients with cancer

STUDY; LOCATION OF STUDY; TYPE OF STUDY	STUDY QUESTION	STUDY POPULATION	INTERVENTION	CONTROL GROUP	VARIABLES	RESULTS
Raghavendra et al (2007)[17]; Bangalore, India; RCCS	Can yoga reduce N and V caused by CT and improve quality of life, anxiety, and depression?	Women with operable breast cancer receiving adjuvant CT with or without RT (n = 62); recent Dx	• Integral yoga for duration of CT • 30-min sessions before each CT plus personal practice	Psychodynamic therapy	• MANE • STAI • BDI • FLIC	Yoga reduced the frequency and intensity of N and V caused by CT. Quality of life improved and level of distress declined, as did intensity of symptoms of anxiety and depression
Vadiraja et al (2009)[18]; Bangalore, India; RCCS	Can yoga reduce the symptoms of distress and improve quality of life?	Women with breast cancer receiving adjuvant RT (n = 88)	• Integral yoga • Length: 6 wk; weekly 60-min sessions	Support psychotherapy	• RSCL • EORTC	Decrease in psychological distress, fatigue, insomnia, and loss of appetite were observed. Level of physical functioning improved, in correlation with amelioration in various physical and psychological symptoms
Ulger and Yağli (2010)[19]; Ankara, Turkey; PS	What effect does yoga have on quality of life and level of distress in patients with cancer?	Women with cancer, regardless of type, ≥ 6 mo after CT (n = 20)	• Classical yoga • Length: 4 wk; 8 biweekly 60-min sessions	None	• NHP • STAI • STATE • VAS	The participants' quality of life improved after 8 sessions. Level of anxiety appeared to diminish. Level of satisfaction was significant ($P < .05$)

BDI—Beck Depression Inventory, CT—chemotherapy, Dx—diagnosis, EORTC—European Organization for Research in the Treatment of Cancer–Quality of Life Symptom Scale, FLIC—Functional Living Index–Cancer, MANE—Morrow Assessment of Nausea and Emesis, N and V—nausea and vomiting, NHP—Nottingham Health Profile, PS—pilot study, RCCS—randomized controlled clinical study, RSCL—Rotterdam Symptom Checklist, RT—radiation therapy, STAI—State-Trait Anxiety Inventory, STATE—Spielberger State Anxiety Inventory, VAS—visual analogue scale (used here as a satisfaction scale).

Table 3. Studies without a control group, conducted in North America to determine the effect of yoga on patients with cancer

STUDY; LOCATION OF STUDY; TYPE OF STUDY	STUDY QUESTION	STUDY POPULATION	INTERVENTION	CONTROL GROUP	VARIABLES	RESULTS
Danhauer et al (2008)[20]; Winston-Salem, USA; PS	Does yoga reduce fatigue, anxiety, and symptoms of depression? Does it improve positive affect and quality of life?	Women with breast cancer (n = 14) or ovarian cancer (n = 37); Dx in past 2 y (total n = 51)	• Restorative yoga • Length: 10 wk; weekly 75-min sessions, with no personal practice	None	• SF-12 • FACT-G • FACIT-Sp • CES-D • STAI • PANAS • PE	The program generated a decrease in depressive symptoms, negative mood, and level of anxiety. Overall quality of life improved as did assessment of physical and mental health. Some effects occurred during intervention; others occurred after 2 mo
Duncan et al (2008)[21]; Winnipeg, Man; PFS	Does yoga improve physical, emotional, and spiritual well-being?	Men or women with cancer, regardless of type (n = 24)	• Iyengar yoga • Length: 10 wk; weekly 90-min sessions with no personal practice	None	• MYMOP2 • FACT-G • FACIT-Sp • POMS-SF • PE	The intervention brought about an improvement in physical symptoms, quality of life, spiritual well-being, and mood disturbances. Improvement in quality of life persisted over time

CES-D—Centers for Epidemiologic Studies Depression scale, Dx—diagnosis, FACIT-Sp—Functional Assessment of Chronic Illness Therapy–Spiritual Well-being, FACT-G—Functional Assessment of Cancer Therapy–General, MYMOP2—Make Yourself Medical Outcome Profile version 2, PANAS—Positive and Negative Affect Schedule, PE—program evaluation based on qualitative interviews, PFS—prospective follow-up study, POMS-SF—Profile of Mood States–Short Form, PS—pilot study, SF-12—12-Item Short Form Health Survey, STAI—State-Trait Anxiety Inventory, USA—United States of America.

raised the possibility that the measurement instruments used were not sensitive enough to pick up subtle differences in a population that did not present with a priori psychiatric pathologies.[13,14] Additional research to identify the most appropriate measurement scales for non-psychiatric patient populations will therefore be necessary for subsequent studies. It is also possible that a methodology based on quantitative approaches is not appropriate for this type of intervention or this patient population, whose reality is both complex and constantly changing. This possibility opens the door to qualitative research. Indeed, many studies documented positive feedback from participants at the end of a program. These comments suggest high levels of satisfaction and improved quality of life, indicating that the programs were effective.[20,21,28-30]

Finally, no complications were reported in the studies surveyed; the ethical implications of this for future research are not negligible. Some authors, however, raise the possibility that increased self-awareness could have an effect on a subject's level of anxiety or even on his or her level of pain.[31] In spite of the fact that there is every indication that these effects are transitory, by introducing negative results into the proposed measurement scales, these aspects might have interfered with the overall response which was, otherwise, positive.

Limitations

It is entirely possible that we missed some articles because of the research strategy we employed. However, even with the use of very general key words, it was not necessary to further restrict our search. Because only a small number of articles were identified, it was possible to develop an overview of the current literature. However, because studies with disappointing results might not have been published, a publication bias might exist.

Conclusion

This review of the literature demonstrates that, within the scientific community, there is growing interest in complementary modalities designed to improve quality of life. In spite of the methodologic limits of the studies presented, the results suggest an improvement in a range of symptoms of patients with cancer with the use of therapeutic yoga. It also appears that quality of life, either overall or certain aspects thereof, improved. The absence of side effects and the excellent cost-benefit ratio are non-negligible aspects that are systematically reported. In their consideration of the whole patient, family physicians might find that yoga is a safe tool and an alternative to standard pharmacologic treatment, which is sometimes limited in its ability to relieve the symptoms caused by cancer.

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Contributors
Both authors contributed to the literature review and the preparation of this article.

Competing interests
None declared

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References

1. Canadian Cancer Society Steering Committee. *Canadian cancer statistics 2010. Special topic: end-of-life care*. Toronto, ON: Canadian Cancer Society, 2010. Available from: **www.cancer.ca/~/media/CCS/Canada%20wide/Files%20List/English%20files%20heading/pdf%20not%20in%20publications%20section/Canadian%20Cancer%20Statistics%202010%20-%20English.ashx**. Accessed 2012 Jul 23.
2. Daneault S, Lussier V, Mongeau S, Hudon É, Paillé P, Dion D, et al. Primum non nocere: could the health care system contribute to suffering? In-depth study from the perspective of terminally ill cancer patients. *Can Fam Physician* 2006;52:1574-5.
3. Daneault S, Lussier V, Mongeau S, Paillé P, Hudon É, Dion D, et al. The nature of suffering and its relief in the terminally ill: a qualitative study. *J Palliat Care* 2004;20(1):7-11.
4. Statistics Canada [website]. *Catalogue no. 82-226-X. Cancer survival statistics. 1992 to 2002*. Ottawa, ON: Statistics Canada; 2011. Available from: **www.statcan.gc.ca/pub/82-226-x/82-226-x2011001-eng.pdf**. Accessed 2012 Jul 23.
5. Cassileth BR. Evaluating complementary and alternative therapies for cancer patients. *CA Cancer J Clin* 1999;49(6):362-75.
6. Iyengar BK. *Light on yoga*. New York, NY: Schocken Books; 1966.
7. The International Association of Yoga Therapists [website]. Prescott, AZ: The International Association of Yoga Therapists; 2012. Available from **www.iayt.org**. Accessed 2012 Jul 23.
8. Taylor MJ. What is yoga therapy? An IAYT definition. *Yoga Therapy in Practice* 2007 Dec. p. 3. Available from: **www.iayt.org/site_Vx2/publications/articles/IAYT%20Yoga%20therapy%20definition%20Dec%202007%20YTIP.pdf**. Accessed 2012 Jul 23.
9. Tindle HA, Davis RB, Phillips RS, Eisenberg DM. Trends in use of complementary and alternative medicine by US adults: 1997-2002. *Altern Ther Health Med* 2005;11(1):42-9.
10. Buettner C, Kroenke CH, Phillips RS, Davis RB, Eisenberg DM, Holmes MD. Correlates of use of different types of complementary and alternative medicine by breast cancer survivors in the nurses' health study. *Breast Cancer Res Treat* 2006;100(2):219-27. Epub 2006 Jul 5.
11. Chandwani KD, Thornton B, Perkins GH, Arun B, Raghuram NV, Nagendra HR, et al. Yoga improves quality of life and benefit finding in women undergoing radiotherapy for breast cancer. *J Soc Integr Oncol* 2010;8(2):43-55.
12. Danhauer SC, Mihalko SL, Russell GB, Campbell CR, Felder L, Daley K, et al. Restorative yoga for women with breast cancer: findings from a randomized pilot study. *Psychooncology* 2009;18(4):360-8.
13. Moadel AB, Shah C, Wylie-Rosett J, Harris MS, Patel SR, Hall CB, et al. Randomized controlled trial of yoga among a multiethnic sample of breast cancer patients: effects on quality of life. *J Clin Oncol* 2007;25(28):4387-95. Epub 2007 Sep 4.
14. Cohen L, Warneke C, Fouladi RT, Rodriguez MA, Chaoul-Reich A. Psychological adjustment and sleep quality in a randomized trial of the effects of a Tibetan yoga intervention in patients with lymphoma. *Cancer* 2005;100(10):2253-60.
15. Engstrom CA, Strohl RA, Rose L, Lewandowski L, Stefanek ME. Sleep alterations in cancer patients. *Cancer Nurs* 1999;22(2):143-8.
16. Koopman C, Nouriani B, Erickson V, Anupindi R, Butler LD, Bachmann MH, et al. Sleep disturbances in women with metastatic breast cancer. *Breast J* 2002;8(6):362-70.
17. Raghavendra RM, Nagarathna R, Nagendra HR, Gopinath KS, Srinath BS, Ravi BD, et al. Effects of an integrated yoga programme on chemotherapy-induced nausea and emesis in breast cancer patients. *Eur J Cancer Care* (Engl) 2007;16(6):462-74.
18. Vadiraja SH, Rao MR, Nagendra RH, Nagarathna R, Rekha M, Vanitha N, et al. Effects of yoga on symptom management in breast cancer patients: a randomized controlled trial. *Int J Yoga* 2009;2(2):73-9.
19. Ulger O, Yağli NV. Effects of yoga on quality of life in cancer patients. *Complement Ther Clin Pract* 2010;16(2):60-3. Epub 2010 Mar 5.
20. Danhauer SC, Tooze JA, Farmer DF, Campbell CR, McQuellon RP, Barrett R, et al. Restorative yoga for women with ovarian or breast cancer: findings from a pilot study. *J Soc Integr Oncol* 2008;6(2):47-58.
21. Duncan MD, Leis A, Taylor-Brown JW. Impact and outcomes of an Iyengar yoga program in a cancer centre. *Curr Oncol* 2008;15(Suppl 2):s109.es72-8.
22. Damodaran A, Malathi A, Patil N, Shah N, Suryavansihi, Marathe S. Therapeutic potential of yoga practices in modifying cardiovascular risk profile in middle aged men and women. *J Assoc Physicians India* 2002;50(5):633-40.
23. Vempati R, Bijlani RL, Deepak KK. The efficacy of a comprehensive lifestyle modification programme based on yoga in the management of bronchial asthma: a randomized controlled trial. *BMC Pulm Med* 2009;9:37.
24. Sherman KJ, Cherkin DC, Erro J, Miglioretti DL, Deyo RA. Comparing yoga, exercise, and a self-care book for chronic low back pain: a randomized, controlled trial. *Ann Intern Med* 2005;143(12):849-56.
25. Williams KA, Petronis J, Smith D, Goodrich D, Wu J, Ravi N, et al. Effect of Iyengar yoga therapy for chronic low back pain. *Pain* 2005;115(1-2):107-17.
26. Shapiro D, Cook IA, Davydov DM. Yoga as a complementary treatment of depression: effects of traits and moods on treatment outcome. *Evid Based Complement Alternat Med* 2007;4(4):493-502.
27. Desai K, Bowman MA, Galantino ML, Hughes-Halbert C, Vapiwala N, Demichele A, et al. Predictors of yoga use among patients with breast cancer. *Explore* (NY) 2010;6(6):359-63.
28. Rosenbaum E, Gautier H, Fobair P, Neri E, Festa B, Hawn M, et al. Cancer supportive care, improving the quality of life for cancer patients. A program evaluation report. *Support Care Cancer* 2004;12(5):293-301. Epub 2004 Feb 26.
29. Selman L, Higginson IJ. 'A softening of edges': a comparison of yoga classes at palliative care services in New Delhi and London. *Int J Palliat Nurs* 2010;16(11):548-54.
30. McDonald A, Burjan E, Martin S. Yoga for patients and carers in a palliative day care setting. *Int J Palliat Nurs* 2006;12(11):519-23.
31. Culos-Reed SN, Carlson LE, Daroux LM, Hately-Aldous S. Discovering the physical and psychological benefits of yoga for cancer survivors. *Int J Yoga Therap* 2004;14(1):45-52.